Logging in Kootenay Landscapes: The Public Response

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ABSTRACT

As recreation and tourism become increasingly important in British Columbia, more attention is being directed towards scenic quality in forest management. To assist forest managers in making decisions that take public perceptions into account, this study explored public preferences for forest landscapes with varying levels of alteration. Results of a photo-questionnaire administered in the east and west Kootenays indicated that preferences are affected most by the presence or absence of highly visible alteration, and second by the drama of the landscape. Dramatic landscapes (largely more vertical and complex) were more preferred than less dramatic ones. A high degree of correlation was found between these preferences and the B.C. Forest Service Visual Quality Objective ratings. In attitudes towards forest management, respondents felt that environmental quality was the most important factor to consider, followed by scenic quality and economics. Overall, the relationships between visual preferences and expressed attitudes did not follow any clear pattern.

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1. INTRODUCTION

As recreation and tourism become increasingly important components of the economy in British Columbia, more attention is being directed towards the scenic values of the landscape. Although the province depends heavily on logging activity, and the evidence of that activity cannot be hidden from view, the Ministry of Forests recognizes that scenic quality is a major factor in the public's enjoyment of the landscape (B.C. Ministry of Forests 1981). Ministry efforts to examine the visual impacts of logging and to incorporate measures that harmonize those impacts were published first in the *Forest Landscape Handbook* (1981), and subsequently in its policy on landscape management (1982). These documents are used in the Ministry's Recreation program to implement landscape management concepts and techniques throughout the province.

The public is becoming more aware of environmental and recreation issues, and better able to express their views through group and community structures. At the same time, the B.C. Forest Service is involving them more in the decision-making process, and considering public sensitivity in forest landscape management. While the guidelines provided in the *Forest Landscape Handbook* are in accordance with general design principles and are based on research in other locales, it is not known whether the landscape management techniques described adequately reflect public perceptions and preferences. This study set out to examine that question.

The project had six main objectives:

1. to determine the preferences of the public for forest landscapes showing various levels of alteration;
2. to test the degree to which public preferences compare with the visual quality objectives used by the B.C. Forest Service in landscape management;
3. to determine whether preferences vary among socio-economic groups or communities;
4. to measure public attitudes related to forest landscape management;
5. to determine whether public attitudes vary among socio-economic groups and communities; and
6. to determine the relationships between landscape preferences and attitudes.

2. MEASURING LANDSCAPE PREFERENCES

In 1968, Litton developed a landscape management system which was subsequently adopted by the U.S. and B.C. Forest Services (Litton 1968). The system is based on the inventory and analysis of physical landscape features, the assessment of public sensitivity toward the landscape, the establishment of landscape standards, and a subsequent design to meet those standards. The five standards, called Visual Quality Objectives (VQO's), span a spectrum ranging from "no logging" (Preservation) to "a maximum amount of logging" (Maximum Modification). (See the Glossary for more detailed definitions.)

Since this benchmark work, the literature has focussed on how landscapes are perceived, and on the effects landscape attributes have on perception. The key finding of one of the first landscape preference studies was that scenic beauty could be quantified (Shafer and Mietz 1970). Other studies have found informational factors, rather than content factors, to be important predictors of preference (Kaplan 1977, 1983; S. Kaplan 1979a, 1979b; Herzog *et al.* 1982; Kaplan and Kaplan 1982). People have inherent needs to make sense of, and to be involved with, their environments; they prefer scenes that have coherence and complexity. Legibility, mystery, and a sense of space also affect environmental preferences. In addition, Kaplan (1973) looked at the effect of training on perceptions, and found that the preferences of environmental designers were clearly different from those of the public. Buhyoff *et al.* (1978) found, however, that once designers knew what the public's landscape preferences were, they could reliably replicate those preferences.

A number of more recent studies that focussed on forested landscape scenes all found that natural-appearing landscapes were preferred over dominantly altered ones (Williamson and Chalmers 1982; Miller 1984; McCool *et al.* 1986; Bekker 1987;). Scrutiny of the more preferred natural scenes revealed that those with depth, distant views, steep mountain faces, and water — and especially a combination of these attributes — were particularly liked. Within the least preferred scenes were recent, ill-fitting, dominant, human-caused alterations in the foreground or middleground (see the Glossary).

Between the two extremes in preference, relationships linking perceptions to physical attributes were less straightforward. Miller (1984), looking at coastal shoreline scenes, found that clearcuts and natural forest openings were similarly rated, and that smaller developments such as cottages and lighthouses were perceived to enhance landscapes. Dominant alterations in the background were given higher ratings than those closer in, illustrating the positive effect of distance. The studies by McCool *et al.* (1986) and Bekker (1987) both indicated that selection cuts (in which a substantial number of trees were left standing after timber harvesting) had little if any effect on preferences when compared to unaltered landscapes. McCool *et al.* related findings to the Visual Quality Objectives used in forest landscape management, and found that scenes with Retention or Partial Retention alterations (see the Glossary) were rated the same as equivalent scenes without alteration.

While many urban landscape studies have shown preferences among respondents to be fairly consistent (Kaplan and Kaplan 1982; Berris[1]), socio-economic factors have been found to affect landscape preferences in some forest landscape studies. Visitors from outside British Columbia and home-makers preferred clearcuts and natural forest openings more than others (Miller 1984); people older than 45 years were found to be more tolerant of development and alterations (Williamson and Chalmers 1982; Miller 1984;); and environmental groups appeared to value natural-appearing scenes and to abhor dominantly-altered scenes more than did others (Dearden 1984; McCool *et al.* 1986).

Of the landscape preference studies which have been undertaken, only a few have been carried out in British Columbia. The scenic preferences and attitudes of the province's residents and visitors are not well known. Landscape managers judge the appropriateness of proposed alterations to the best of their abilities, but controversy about the effects of logging on scenery still abounds.

3. METHODS

A photo-questionnaire was the primary tool for this analysis. This technique has been shown to provide reliable measures of preference (R. Kaplan 1979). Photographs of forest landscapes in the east and west Kootenays were selected to represent the types of landscapes and the degrees of forest alteration occurring in that region (Figure 1). The photographs depict unaltered landscapes within the VQO of Preservation (P), and altered landscapes meeting the VQO's of Retention (R), Partial Retention (PR), Modification (M), and Maximum Modification (MM). Also depicted were examples of Unacceptable Modification (UM). The 36 photographs selected represent five primary types of scene composition in which the major elements in the foreground and middleground are Road (R), Road and Land (RL), Land (L), Land and Water (LW), or Water (W). All scenes include a forested backdrop. The photographs were taken with 100 ASA Fujichrome film and a 50 mm lens.

The questionnaire asked respondents to rate each photograph according to their liking for it on a 5-point scale. Several questions were also asked about attitudes related to the visual impacts of logging, clearcutting, and the importance and priorities of specific forest management aspects. Several items relating to background and demographic characteristics completed the questionnaire. Space for comments was available next to photograph ratings, on all preference and attitude questions, and at the end of the form.

Six communities with specific economic structures were selected for sampling. Canal Flats (1981 pop.: 919[2]) is a small logging community whose major employment base is the local sawmill. Fairmont Hot Springs (1981 pop.: 164) is a resort community with an exclusive lodge and condominiums that offers year-round recreation, including golf, hot springs spa, and skiing. Invermere (1986 pop.: 1998) is a small diverse service centre for industry, commerce, recreation, and residential uses. Radium Hot Springs (1981 pop.: 419), in Kootenay National Park, is another resort. It includes a lodge and hot springs spa "aquacentre" and is generally less costly than Fairmont. Nakusp (1986 pop.: 1410) is the most isolated of the communities, and is more oriented to industry than Invermere. A forestry operations base that recently closed has caused a state of transition in the community. Finally, New Denver (1986 pop.: 596) contains primarily a combination of resource sector workers, and seekers of an alternative lifestyle. A minimum of 4% of the total population was sampled in each community, and a minimum of 36 respondents was sampled in each of the smaller communities.

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[1] Berris, C. 1986. Suburban housing environments: resident preferences and satisfaction. Catherine Berris Associates Inc., Unpubl. ms.
[2] All population figures from Statistics Canada.

Slides were processed as 3 × 5 inch colour prints, mounted on six cardboard panels. A survey team of two visited the communities and approached people door-to-door, in shops and other businesses, and in the lodge and aquacentre lobbies. In the residential communities, at least half of the respondents were contacted at their homes. After agreeing to participate in the study and receiving directions, respondents were left with the photographs and the questionnaire for 20–30 minutes. In Invermere, classes of Grade 9 and Grade 12 students also completed the survey.

Photograph preferences were analyzed using the Guttman-Lingoes Smallest Space Analysis III (SSA-III) (R. Kaplan 1974), a method of dimensional analysis which groups the photographs according to how they were perceived by the respondents. Photograph groups and questionnaire responses were compared using T-test and chi-square statistics. Based on the analysis, observations and conclusions were outlined.

4. RESULTS AND DISCUSSION

4.1 General

There were 321 questionnaires completed. Table 1 summarizes the characteristics of the respondents.

TABLE 1. Characteristics of respondents

Area	%
Kootenays	81
B.C.	12
Other	3
No answer (N/A)	3

Sex	%
Male	49
Female	48
N/A	3

Education	%
Under 10 years	15
10–12 years	50
13–16 years	18
Over 16 years	12
N/A	5

Purpose of Presence	%
Resident	77
Travel	12
Other	8
N/A	3

Occupation	%
Homemaker	12
Professional[a]	19
Business employee	22
Forestry employee	5
Retired	9
Student	14
Other	21
N/A	6

Number of Years Resident in Kootenays	%
None	28
1–5	8
6–10	11
11–20	25
21–80	28

Age	%
Under 20	15
20–29	13
30–39	23
40–49	18
50–59	13
Over 60	15
N/A	3

Household Income	%
Under $20 000	22
$20 000–39 999	31
$40 000–59 999	18
Over $60 000	5
N/A	24

Location Surveyed	%		No.	Total
Canal Flats	11			36
Fairmont	15	Condominiums	20	49
		Lodge lobby	16	
		Lodge staff	13	
Invermere	29	Grade 9	21	93
		Grade 12	18	
		Other	54	
Radium	12	Aquacentre	33	39
		Staff	6	
Nakusp	20			64
New Denver	12			39

[a] "Professional" includes business owners, educators, and other professionals.

The sample included a fairly even distribution of respondents, in most characteristics, except that there were not many tourists. This can be explained by the timing of the survey, which occurred during the first 10 days of December, the slow season for tourism in the area.

4.2 Photograph Preferences

CLUSTERS

Results of the SSA-III analysis of the photographs yielded three groups of photographs based on individual preference ratings (Table 2). These clusters describe the general way respondents viewed the photographs. Each cluster was distinct, unlike the less clear groups which have resulted from other photo-questionnaires (R. Kaplan, pers. comm., 1988).

Four of the photographs were eliminated because their loadings were either too low (No. 22), or they were high (>.40) on more than one cluster (Nos. 6, 19, 20). The preference for each cluster is significantly different ($p<.05$) from the preference for any other cluster. They have been named according to their distinguishing characteristics. Figure 1 presents the photographs in their clusters.

TABLE 2. Photograph clusters

No.	Cluster name	No. of photos	Mean[a]
I.	Visibly altered	18	2.53
II.	Unaltered	7	3.39
III.	Unaltered dramatic	7	3.81

[a] **Rating scale**

1 = do not like it at all
2 = like it a little
3 = like it somewhat
4 = like it quite a bit
5 = like it very much

Cluster I: Visibly Altered

The characteristic most distinguished by viewers was the alteration by logging. Every photograph in Cluster I looks highly altered. One photograph (No. 25) actually shows natural bald spots, but was evidently thought to be an alteration as respondents placed it in the Visibly Altered cluster. This is interesting when compared with photograph No. 2, in which the natural openings were viewed as being natural, since that photograph was placed within an Unaltered cluster.

The effects of different types of alteration on preference can be seen through the comparison of photograph means within this cluster. Means were generally higher when the alteration was farther away or less prominent, indicating that distant and/or less prominent alterations are more tolerable than those which are closer and/or more prominent to the viewer.

Cluster II: Unaltered[3]

The Unaltered cluster was more preferred than the Visibly Altered cluster. All of the scenes look relatively unaltered, although two (Nos. 31 and 34) show Retention logging. The scenes are relatively flat topographically, and not very complex. One possible exception to this is photograph No. 1. The placement of this photograph in this group rather than in Cluster III could be due to its position as the first photograph rated by respondents and/or to the scrubby foreground mentioned in comments on the scene.

[3] "Unaltered" used here is synonomous with "natural-appearing", in that alterations may have taken place but are not discernible.

Cluster III: Unaltered Dramatic

The Unaltered Dramatic cluster was the most preferred group of photographs. Although all of the scenes look unaltered, one photograph (No. 17) does include some Partial Retention logging. What distinguishes these photographs from Cluster II is the drama present in the scenes. These photographs all appear to have higher mountains and more scenic variation. Every one has either snow-capped peaks or water in the middleground, except for one (No. 8) which has a bright green field and pastoral landscape in the foreground.

Unclustered photographs

Since the clusters help to identify how respondents viewed each photograph, it is informative to analyze the photographs that did not fall within any cluster. Photographs No. 6, 19, 20, and 22 all had higher loadings on both the Visibly Altered and the Unaltered Dramatic clusters. This implies that these photographs were seen as altered scenes by some people, and as unaltered by others.

Photograph groupings

Photograph preferences were also compared according to the original groupings of the scenes. Table 3 lists those results in descending order of the means.

The preferences for the VQO groups followed the order established by the B.C. Forest Service (Table 3). There was a significant difference ($p<.05$) in preference ratings for every group, which suggests that the rating system for VQO's does compare with preference. The mean preference rating of the VQO categories, along with the cluster analysis, seems to indicate that landscape alterations meeting the VQO's of Retention and Partial Retention are generally acceptable.

For the four scene composition types at the bottom of the list in Table 3 (i.e., all but Land/Water), preferences were not significantly different between any adjacent groups. The Land/Water group was significantly preferred to any other group, however. These scenes have land as a foreground, water in the middleground, and forested backdrops — the water, depth, and variety characteristics found to be preferred in other studies. The less preferred scenes in the Water group have less depth and variety, with water in the foreground and mountains in the background. The lower preferences for scenes with roads in them supports previous work in which natural views were shown to be generally preferred over unnatural views.

TABLE 3. Rank order of original photograph groupings

Group name	No. of Photos	Mean[a]
Visual Quality Objective		
Preservation	12	3.54
Retention	3	3.28
Partial Retention	5	3.15
Modification	6	2.66
Maximum Modification	6	2.54
Unacceptable Modification	4	2.32
Scene Composition		
Land/Water	6	3.41
Water	5	3.12
Land	10	3.08
Road/Land	4	3.04
Road	7	2.99

[a] **Rating scale**

1 = do not like it at all
2 = like it a little
3 = like it somewhat
4 = like it quite a bit
5 = like it very much

Cluster I: Visibly Altered

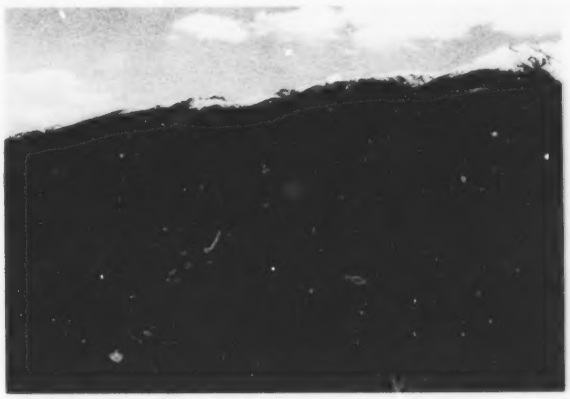
#	VQO	SCT	Mean	Rank	Clus
3	M	LW	3.36	12	I

#	VQO	SCT	Mean	Rank	Clus
5	UM	L	2.44	27	I

#	VQO	SCT	Mean	Rank	Clus
10	UM	R	2.73	24	I

#	VQO	SCT	Mean	Rank	Clus
11	PR	R	2.87	22	I

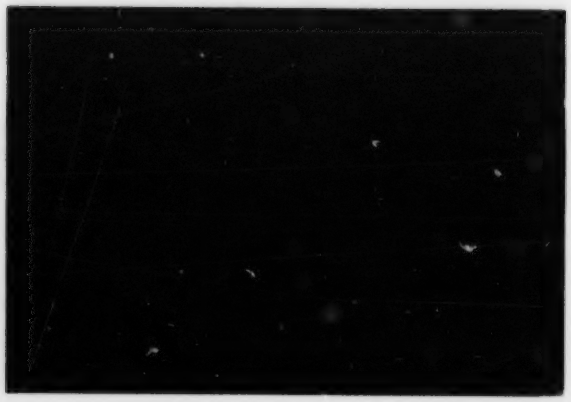
#	VQO	SCT	Mean	Rank	Clus
12	M	RW	2.30	30	I



#	VQO	SCT	Mean	Rank	Clus
13	MM	RL	1.96	35	I

FIGURE 1. Photographs

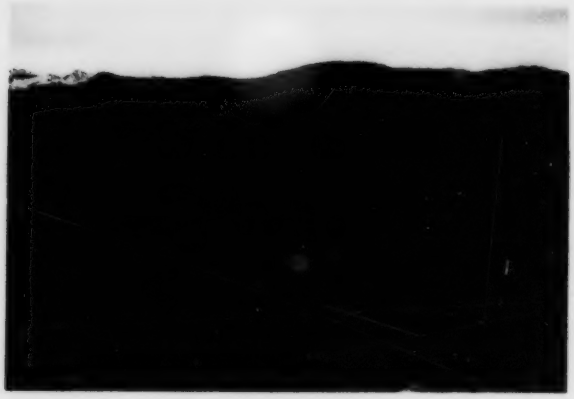
#	VQO	SCT	Mean	Rank	Clus
18	MM	L	2.72	25	I



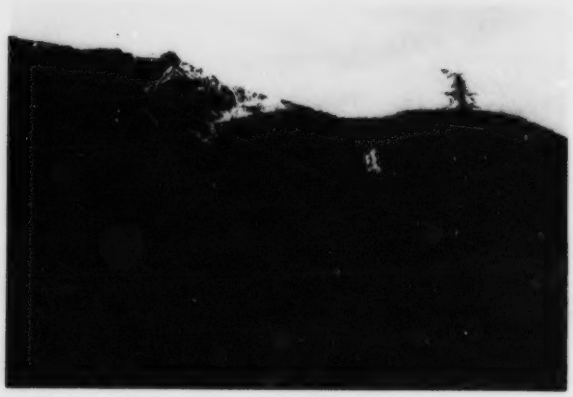
#	VQO	SCT	Mean	Rank	Clus
21	UM	R	1.92	36	I

#	VQO	SCT	Mean	Rank	Clus
23	MM	W	2.24	33	I

#	VQO	SCT	Mean	Rank	Clus
25	P	R	2.39	29	I



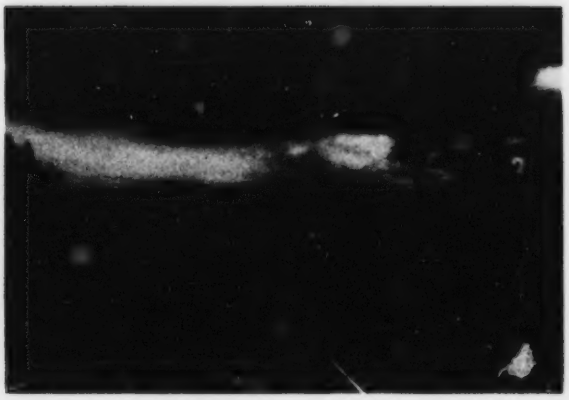
#	VQO	SCT	Mean	Rank	Clus
26	M	LW	2.26	31	I



#	VQO	SCT	Mean	Rank	Clus
27	R	L	2.96	21	I

FIGURE 1. (Continued)

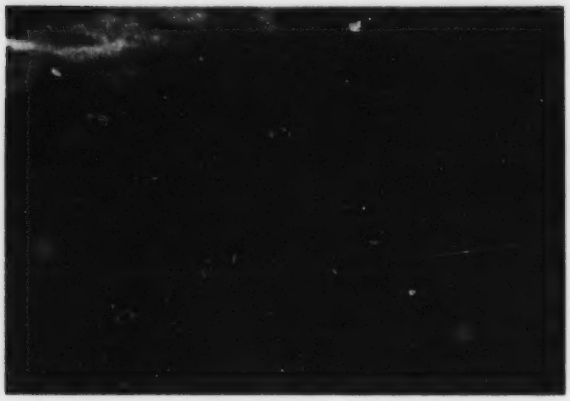
#	VQO	SCT	Mean	Rank	Clus
28	M	L	2.41	28	I



#	VQO	SCT	Mean	Rank	Clus
29	M	R	2.53	26	I

#	VQO	SCT	Mean	Rank	Clus
30	MM	L	2.24	32	I

#	VQO	SCT	Mean	Rank	Clus
32	UM		2.22	34	I

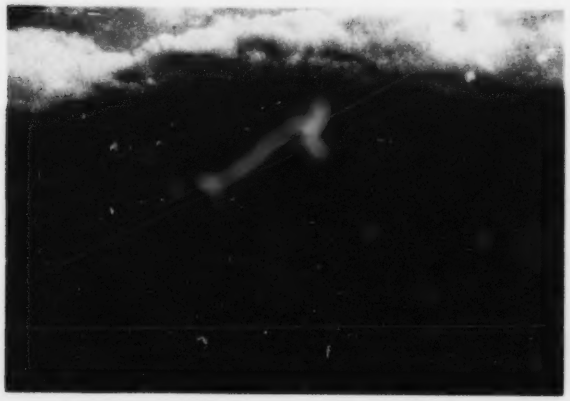


#	VQO	SCT	Mean	Rank	Clus
35	MM	L	3.31	13	I

#	VQO	SCT	Mean	Rank	Clus
36	MM	W	2.86	23	I

FIGURE 1. (Continued)

Cluster II: Unaltered

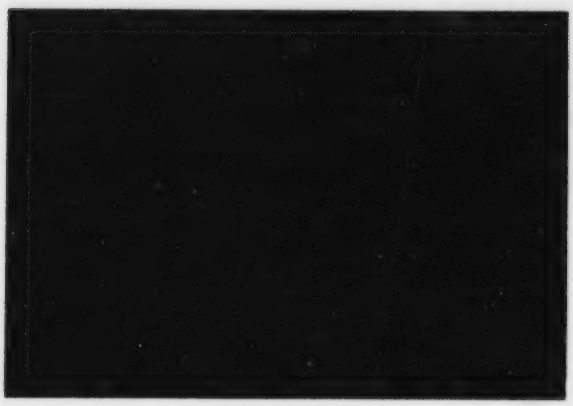


#	VQO	SCT	Mean	Rank	Clus
1	P	RL	3.47	10	II

#	VQO	SCT	Mean	Rank	Clus
2	P	W	3.12	18	II

#	VQO	SCT	Mean	Rank	Clus
4	P	R	3.28	15	II

#	VQO	SCT	Mean	Rank	Clus
15	P	R	3.59	5	II



#	VQO	SCT	Mean	Rank	Clus
31	R	L	3.31	14	II

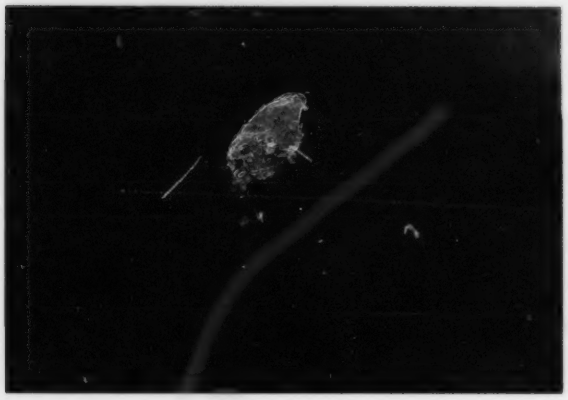
#	VQO	SCT	Mean	Rank	Clus
33	P	L	3.42	11	II

FIGURE 1. (Continued)

Cluster III: Unaltered Dramatic

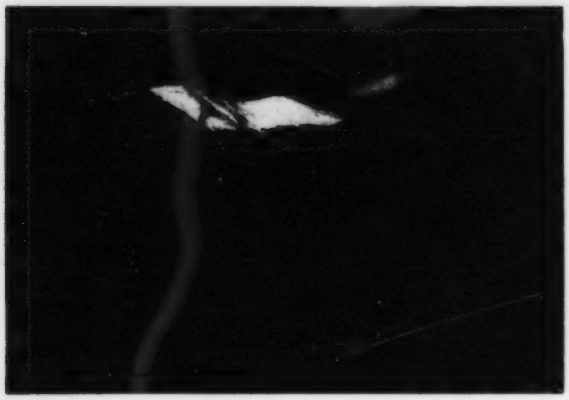
#	VQO	SCT	Mean	Rank	Clus
34	R	W	3.57	7	II

#	VQO	SCT	Mean	Rank	Clus
7	P	LW	4.31	1	III



#	VQO	SCT	Mean	Rank	Clus
8	P	L	4.03	2	III

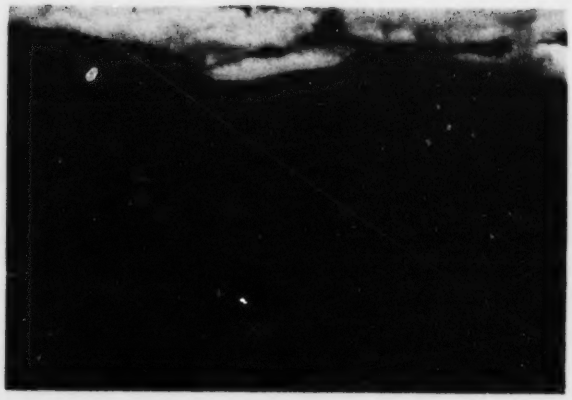
#	VQO	SCT	Mean	Rank	Clus
9	P	LW	3.90	3	III



#	VQO	SCT	Mean	Rank	Clus
14	P	RL	3.57	8	III

#	VQO	SCT	Mean	Rank	Clus
16	P	R	3.58	6	III

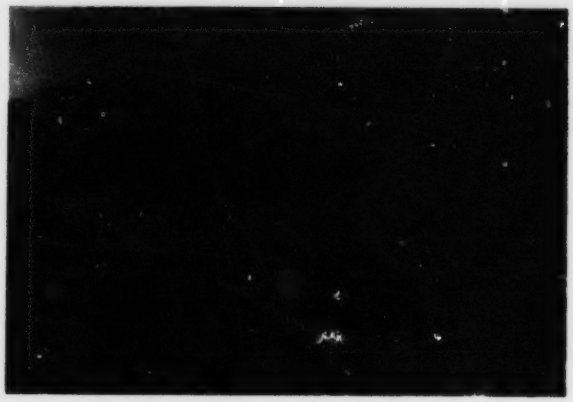
FIGURE 1. (Continued)



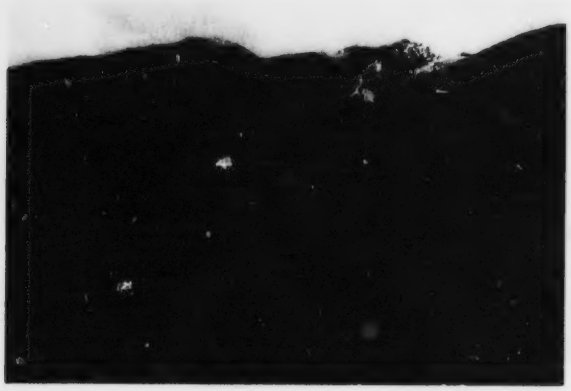
#	VQO	SCT	Mean	Rank	Clus
17	PR	LW	3.49	9	III

#	VQO	SCT	Mean	Rank	Clus
24	P	W	3.80	4	III

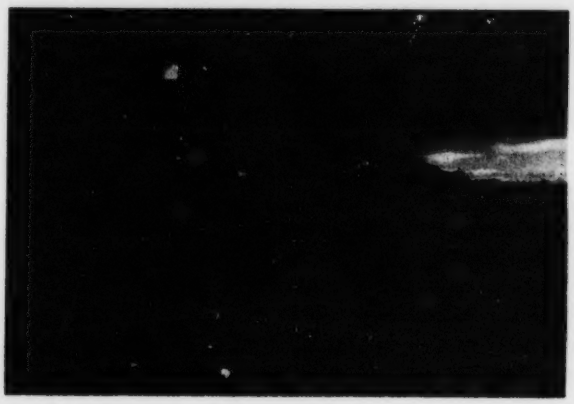
Unclustered



#	VQO	SCT	Mean	Rank	Clus
6	PR	LW	3.15	17	X



#	VQO	SCT	Mean	Rank	Clus
19	M	L	3.09	20	X



#	VQO	SCT	Mean	Rank	Clus
20	PR	L	3.11	19	X

#	VQO	SCT	Mean	Rank	Clus
22	PR	RL	3.18	16	X

FIGURE 1. (Concluded)

TABLE 4. List of photographs with landscape categories and results

Photograph No. (#)	Landscape Categories: Scene Composition VQO	Scene Composition Type (SCT)	Results: Mean	Rank	Clusters[a]
1	P	RL	3.47	10	II
2	P	W	3.12	18	II
3	M	LW	3.36	12	I
4	P	R	3.28	15	II
5	UM	L	2.44	27	I
6	PR	LW	3.15	17	X
7	P	LW	4.31	1	III
8	P	L	4.03	2	III
9	P	LW	3.90	3	III
10	UM	R	2.73	24	I
11	PR	R	2.87	22	I
12	M	RW	2.30	30	I
13	MM	RL	1.96	35	I
14	P	RL	3.57	8	III
15	P	R	3.59	5	II
16	P	R	3.58	6	III
17	PR	LW	3.49	9	III
18	MM	L	2.72	25	I
19	M	L	3.09	20	X
20	PR	L	3.11	19	X
21	UM	R	1.92	36	I
22	PR	RL	3.18	16	X
23	MM	W	2.24	33	I
24	P	W	3.80	4	III
25	P	R	2.39	29	I
26	M	LW	2.26	31	I
27	R	L	2.96	21	I
28	M	L	2.41	28	I
29	M	R	2.53	26	I
30	MM	L	2.24	32	I
31	R	L	3.31	14	II
32	UM		2.22	34	I
33	P	L	3.42	11	II
34	R	W	3.57	7	II
35	MM	L	3.31	13	I
36	MM	W	2.86	23	I

[a] Respondents viewed and rated the photographs in the order presented above in Table 4. However for analytical ease, the photographs in Figure 1 were re-ordered according to their clusters.

PAIRED COMPARISONS

The final analysis of photograph preferences compared ratings of pairs of photographs. Pairs were chosen for their similarity in content and composition. In all photographs where the degree of alteration varied considerably within pairs, the photograph with less alteration was significantly preferred: Nos. 8–31, 8–19, 17–12, 16–11, 7–3, 24–23, 9–26, 27–32, and 18–5 (the more preferred photograph is listed first). Where the degree of alteration of the preferred photograph was the same as or less than the alteration in the other photograph, the following distinctions between the photographs have been noted:

- Nos. 5 and 32 show the same cut, but in the preferred No. 5, the cut is smaller and less central in the photograph.
- Nos. 18 and 30 show the same degree of alteration, and although the preferred No. 18 has less depth, the clearcut is greening up.

- No. 29, a Modification cut, is preferred over No. 25 which shows natural bald spots; however, the cut in No. 29 conforms to the landscape and has less contrast than the openings in No. 25.
- The Unacceptable Modification of No. 10 is preferred over the Maximum Modification of No. 13, perhaps because of the greater size and dominance of the cut in No. 13.
- Although No. 34 with a retention cut is preferred over No. 2 which is natural, the cut in No. 34 is barely visible, while No. 2 has rock openings.
- In a pair of photographs with no alterations, No. 15 was significantly preferred to No. 4, the primary difference being that the road in No. 15 is curved, perhaps suggesting the influence of mystery on preference.
- The only two compared photographs which did not vary significantly in preference were the extremely similar Nos. 26 and 30.

The paired comparisons indicate that respondents do distinguish between different alterations. The fitting in of clearcuts with the landscape in terms of form, size, colour contrast, and relative dominance of cutblocks seemed to affect landscape preferences.

Comments on photographs

The comments indicated that some respondents assumed there was alteration in every scene. Comments like "good regrowth", "logging unnoticeable", "nicely done", and "looks more natural" were fairly common on photographs that showed no alteration. In addition, people made comments like "too many trees gone" and "patchy" for scenes with only natural openings. This may help to account for the strong relationship of preferences to the degree of alteration, and the less obvious relationship with other aspects of scenic quality. The comments also help to indicate where ephemeral effects — clouds or colour, features in the foreground, or the darkness of photographs — may have been distracting. There were not enough such comments for any one photograph to justify eliminating any scene from the analysis.

4.3 Attitudes and Values

Responses to questions on attitudes and values are listed in Table 5. Most people held a fairly central position on the impacts of logging on scenery.

With respect to clearcutting, 37% of the respondents were strongly opposed to it or felt it should be allowed only where few people would see it. Only 2% indicated there should be no restrictions on it. To 44% of the respondents, clearcutting was acceptable if it conformed to the landscape or was replanted.

Respondents were asked to rate their own view of the importance of five considerations in forest management. The means on a 5-point scale (where 5 is most important) are listed in Table 5. Rankings of the considerations and a question about their relative importance confirmed that environmental quality was most important, followed by scenic quality and economics. The means for all considerations were very high. Thus, respondents felt that all forest management considerations listed were important, but that environmental and scenic quality should have higher priority than economics.

Comments on attitudes

Additional comments were written by 119 (37%) of the respondents. Many comments (over 45) gave negative remarks about clearcutting in general, while aspects mentioned specifically included the importance of replanting, and dislike of the "mess" left by loggers. Next most frequently mentioned (over 30 comments) was the need for wise or better forest management, with common suggestions including selection logging, looking to Europe for techniques, and the need for more strict monitoring. Also frequently mentioned, with 20–30 comments each, were environmental, visual, economic, and tourism and recreation concerns. Positive comments about the questionnaire design were received from 21 respondents; negative comments came from 4 people.

TABLE 5. Attitudes and values

Attitudes towards logging impacts on scenery	% Respondents
Logging not noticed or it fits well within the landscape	4
Logging causes ugly scars in some places and is hardly noticable elsewhere	47
Logging causes ugly scars which are accepted due to forest regeneration and economic benefits	28
Logging detracts from enjoyment of the scenery	18

Attitudes towards clearcutting	% Respondents
Clearcutting should not be allowed	25
Clearcutting should only be allowed where few will see it	12
Clearcutting is acceptable if cuts fit with landscape forms	22
Clearcutting should be allowed anywhere in any form if it is replanted adequately	22
Clearcutting should have no restrictions placed upon it	2
Clearcutting is unfamiliar/no opinion	9

Importance of five considerations in forest management Consideration	Mean[a]	% First priority	% Second priority
Environmental quality (e.g. soils, wildlife)	4.7	62	15
Quality of the scenery	4.2	16	31
Economics of timber harvesting	4.0	14	24
Wilderness recreation	4.0	6	21
Roadside or near-road recreation	3.8	2	9

[a] Rating scale

1 = not at all important
5 = very important

Economic values should have priority over scenic values	% Respondents
Never	21
Sometimes	65
Always	8

4.4 Relationships Among Photograph Preferences, Attitudes, and Respondent Characteristics

Preference scores for photographs and responses to questions on attitudes and values were compared for all respondent characteristics. Table 6 summarizes the patterns of response. The photographs were compared individually and according to the clusters and the photograph groupings. Where a difference in preference is noted, it indicates that $p<.05$.

Sex

Females had higher preferences for visibly altered and unaltered dramatic scenes. While the higher rating of altered scenes could be related to their greater concern with economics, and the lower male rating could be compared with a higher concern among males for environmental quality, there were no expressed male/female differences related to scenic quality or clearcutting.

Age

Compared to the average, the youngest and oldest respondents had higher preferences for altered scenes, and also placed higher values on economics and lower values on scenery. As well, they were less opposed to clearcutting. The consistency between preference and attitudes in the above age groups did not follow through with the 30- to 40-year age group, which had lower preferences for altered scenes, and which also placed less value on scenic quality.

TABLE 6. Relationships among respondent characteristics, preferences, and attitudes

Respondent characteristics	Landscape Preferences			Attitudes					Tolerance toward C.C.
	I. Alt	II. Unalt	III. Unalt Dram	Env	Econ	Scen	Wild	Road	
Sex									
Male				H					
Female	H		H		H				
Age									
<20		L	L						
* 20–29	H				H				H
30–39	L					L			
40–49					L			H	
50–59								H	
*≥60	H				H	L			H
Occupation									
Homemaker	H	H	H						
Student	L	L	L		L	H			L
Retired		L	L		H		L		
Professional					L				
Forestry employee					H	L	H		H
Education									
< 9 years	H								
10–12 years						H			
*>16 years	L			H	L				L
Income									
$20 000–40 000			H		L				
$40 000–60 000	L						H		
*>$60 000	L			L	L		L	L	L
Location									
Fairmont Condos	H								
Fairmont Lodge									L
Fairmont/Radium staff	L								
Canal Flats		H							H
Nakusp		H							
New Denver		H				L	L	L	
Principal Residence									
Kootenay residents		H			H	L			
Non-residents (B.C.)		L			L				L
Outside B.C.		L					L		H
Length of residence									
* 20 years	H				H	L	L	L	H

H = higher than the norm
L = lower than the norm
* = preferences and attitudes relate

Occupation

Although, when compared with the average response, professionals placed lower values on economics, and forestry employees placed lower value on scenery, these two groups responded similarly to the photographs. Students were very concerned with scenic quality, and generally rated photographs lower. Retired people placed higher values on economics and rated unaltered scenes lower than did other respondents. Homemakers generally gave photographs higher ratings.

Education

Respondents with over 16 years of education were most opposed to clearcutting, and they also rated visibly altered scenes lower. Respondents with the least education gave higher ratings to the Altered cluster. Otherwise, there were no patterns to responses with respect to differences in education.

Income

Participants with household incomes over $60 000 varied most from the other groups. They had lower ratings for all forest management considerations except scenic quality, and gave lower ratings to the Visibly Altered cluster. The $40 000–$60 000 group was most concerned with wilderness recreation, and also gave lower ratings to the Visibly Altered group. The $20 000–$40 000 group placed lower values on economics and gave higher ratings to the Unaltered Dramatic group. The lowest income group did not vary from the general responses in any way.

Location

Considering the significant differences in the characteristics of the communities sampled, there were relatively few differences in preferences and expressed attitudes. The Visibly Altered cluster was liked more by people in the Fairmont condominiums, and less by staff at Fairmont and Radium. All locations viewed the Unaltered Dramatic cluster similarly, and the Unaltered group was preferred more by residents of Canal Flats, Nakusp, and New Denver. There were some specific differences in attitudes in several locations, but these followed no pattern and did not appear to relate to preference ratings. What is more important here than these differences is the similarity in attitudes among the communities.

Principal residence

As observed above, Kootenay residents favoured Unaltered scenes more, and they also placed higher values on economics and lower values on scenery.

Length of residence

Long-time residents (over 20 years) rated altered scenes higher, placed lower values on scenery and higher values on economics, and had less opposition to clearcutting. No significant differences in preferences or attitudes were evident among residents of 0–19 years.

5. CONCLUSIONS

The conclusions of this study are summarized below in relation to the six objectives the study set out to accomplish.

1. What are the public's preferences regarding forest landscapes with various alteration levels?

   In all of the communities sampled, unaltered landscapes were significantly preferred over ones containing highly visible alterations. Of the unaltered scenes, those with greater drama (e.g., snow-capped peaks, water, depth) were significantly preferred over less dramatic ones. Of the altered scenes, those with smaller, less contrasting (in colour, size, and form), and less dominant alterations were preferred over more obvious alterations.

2. To what degree do public preferences compare with the Visual Quality Objectives used by the B.C. Forest Service in landscape management?

Public landscape preferences conformed closely to the Visual Quality Objectives (VQO's) used in landscape management by the Forest Service. Generally, the stricter the VQO met, the more preferred the scene. Of the altered scenes, those meeting the VQO's of Retention and Partial Retention were liked. Alterations meeting the VQO's of Modification, Maximum Modification, and Unacceptable Modification were not liked. At present, the VQO's do not specifically account for the high values attributed by the public to unaltered landscapes and those containing water features.

3. Do preferences vary among socio-economic groups or communities?

   In general, there was a high level of consistency in landscape preferences, both among socio-economic groups and among communities. Significant differences that did occur were:

   Highly visible alterations were LESS acceptable to:

   - those between 30 and 39 years of age
   - those with more education
   - those with higher incomes
   - Fairmont resort staff

   Highly visible alterations were MORE acceptable to:

   - those between 20 and 29 years of age
   - those over 60
   - those with less education
   - those with lower incomes
   - long-term Kootenay residents
   - visitors at Fairmont Hot Springs Lodge
   - residents of Canal Flats, Nakusp, and New Denver

   To summarize, similarity in preferences was prevalent; differences were the exception.

4. What are the public's attitudes and values related to forest landscape management?

   With respect to clearcutting, 37% of the respondents felt that it should either not be allowed or be allowed only where few people would see it. Only 2% felt it should be allowed without restrictions. Clearcutting was acceptable to 44% of the respondents if it conformed to the landscape or was replanted.

   Regarding forest management priorities, respondents generally felt that environmental quality was most important, followed by scenic quality, and then economic values.

5. Do public attitudes and values vary among socio-economic groups or communities?

   Particular groups that valued scenic quality more than other groups were:

   - professionals
   - students
   - those with more education
   - those with higher incomes
   - visitors at Fairmont Hot Springs Lodge

   Groups which gave higher values to economics than other groups were:

   - females
   - those between 20 and 29 years of age
   - those over 60
   - forestry respondents
   - respondents in Canal Flats and New Denver
   - long-time Kootenay residents

6. Is there a relationship between landscape preferences and attitudes?

   There was no overall relationship between landscape preferences and attitudes, although they did correlate in several instances. Specifically, those between 20 and 29 years of age, those over 60, and long-time Kootenay residents rated altered scenes higher, were more tolerant of clearcutting, and placed higher values on economics. Those with the highest incomes and/or most education rated altered scenes lower, were less tolerant of clearcutting, and gave low values to economics.

REFERENCES

Bekker, P. 1987. The public view: landscape perceptions in the West Arm of Kootenay Lake. Landscape Architecture Review 8(2).

British Columbia Ministry of Forests. 1981. Forest landscape handbook. Victoria, B.C.

Buhyoff, G. J., J. D. Wellman, H. Harvey, and R. A. Fraser. 1978. Landscape architects' interpretations of people's landscape preferences. J. Environmental Management, 6:255–262.

Dearden, P. 1984. Factors influencing landscape preferences: an empirical investigation. Landscape Planning 11:293–306.

Herzog, Thomas, S. Kaplan, and R. Kaplan. 1982. The prediction of preference for unfamiliar urban places. Population and Environment 5(1):43–59.

Kaplan, R. 1973. Predictors of environmental preference: designers and clients. Environmental design research. Vol. 1. 4th Internat. EDRA Conf. Dowden, Hutchinson and Ross Inc., Stroudsburg, Penn.

_____. 1974. A strategy for dimensional analyses. *In* Man-environment interactions: evaluations and applications. D. H. Carson (editor). Dowden, Hutchinson and Ross, Stroudsburg, Penn. Appendix.

_____. 1977. Preference and everyday nature: method and application. *In* Perspectives on environment and behavior. D. Stokols (editor). Plenum Press, New York, N.Y., pp. 235–250.

_____. 1979. A methodology for simultaneously obtaining and sharing information. *In* Assessing amenity resource values. U.S. Dept. Agric. For. Serv., Fort Collins, Col., Gen. Tech. Rep. RM-68, pp. 58–66.

_____. 1983. The role of nature in the urban context. *In* Behavior and the natural environment. Altman and J. Wohlwill (editors). Plenum Press, New York, N.Y., pp. 127–161.

_____. 1985. Nature at the doorstep: residential satisfaction and the nearby environment. J. Architectural and Planning Research 2.

Kaplan, S. and R. Kaplan. 1982. Cognition and environment. Praeger, New York, N.Y.

Kaplan, S. 1979a. Concerning the power of content-identifying methodologies. *In* Assessing amenity resource values. U.S. Dept. Agric. For. Serv., Fort Collins, Col., Gen. Tech. Rep. RM-68, pp. 4–13.

_____. 1979b. Perception and landscape: Conceptions and misconceptions. *In* Proc. of Our National Landscape. U.S. Dept. Agric. For. Serv., Gen. Tech. Rep. PSW-35, pp. 241–248.

Litton, R. B., Jr. 1968. Forest landscape description and inventories: A basis for land planning and design. U.S. Dept. Agric. For. Serv., Res. Pap.PSW-49. Berkeley, Cal.

McCool, S., R. Benson, and J. Ashor. 1986. How the Public Perceives the visual effects of timber harvesting: an evaluation of interest group preferences. J. Environ. Manage. 10(3).

Miller, P. A. 1984. Visual preference and implications for coastal Management: a perceptual study of the British Columbia shoreline. Ph.D. thesis. Ann Arbor, Mich.

Shafer, E. L., Jr. and J. Mietz. 1970. It seems possible to quantify scenic beauty in photographs. U.S. Dept. Agric. For. Serv. Res. Pap. NE-162.

Williamsen, D. A. and J. A. Chalmers, 1982. Perceptions of forest scenic quality in Northeast Victoria: a technical report of research Phases I and II. Landscape Manage. Series, For. Commission. Victoria, Australia.

GLOSSARY

Viewing Distance Zones

Foreground: 0–1 km
Middleground: 1–8 km
Background: over 8 km

Visual Quality Objectives

Preservation

- The Preservation VQO allows activities, such as maintenance of minimal facilities (recreation sites, trails), that enhance natural wildland values. Alterations beyond this, such as logging, are not acceptable.
- In the managed forest, preservation may apply to relatively small areas where landscape values are high and outweigh other natural resource values (e.g., some land/water interfaces; special features of visual historical, geological, biological, or educational importance; areas of value for recreation).

Retention

- The Retention VQO requires that management activities or alterations not be visually apparent. The goal is to repeat the line, form, colour, and texture of the characteristic landscape.
- In the managed forest, retention may apply to areas where landscape values are high and where changes may be discernible but not clearly visible (e.g., land/water interfaces, vistas, views, and focal areas).

Partial Retention

- The Partial Retention VQO requires that alterations remain visually subordinate to the characteristic landscape. Repetition of the line, form, colour, and texture is important to ensure a blending with the dominant elements.
- In the managed forest partial retention may apply to areas where landscapes are of aesthetic importance and where management activities generally can match the landscape character and do not cause an obvious intrusion (e.g., where landscapes can absorb change).

Modification

- The Modification VQO allows alterations to dominate the original characteristic landscape. However, alterations must borrow from natural line and form to such an extent and on such a scale that they are comparable to natural occurrences.
- In the managed forest, modification may apply to areas where landscapes are more common and where management actvities can blend with existing dominant lines, shapes, and forms. It applies in particular to first-pass forest development.

Maximum Modification

- The Maximum Modification VQO permits a dominant change to the original landscape, particularly in the foreground and middleground. Alterations may be out of scale or show detail quite different from natural occurrences.
- In the managed forest, Maximum Modification may apply to areas where landscapes are common and where resource use activities dominate the landscape. At close range changes to the landscape may be out of scale, but from a distance changes should appear to be natural occurrences. This VQO also applies in particular to natural disaster areas (e.g., fires, insect infestations, windthrow).

Unacceptable Modification

- Unacceptable Modification does not meet the above criteria. It usually results from excessive opening sizes, excessive amounts of logging and disregard to natural form, line, colour and texture.

Perception

- An impression based on past and/or anticipated experiences; observation; awareness of elements.

Preference

- The act, fact, or principle of liking one over others.

Attitude

- A mental position, feeling, or emotion with regard to a fact or a state.

Value

- Relative worth, utility, or importance; degree of excellence.

APPENDIX 1. Questionnaire

Province of
British Columbia

Ministry of
Forests and Lands

Regional Manager
518 Lake Street
Nelson, B.C.
V1L 4C6

November 24, 1987

File: 770-15

Dear Resident or Visitor in the Kootenays:

We would like your help. We are working on a project to find out how people view forest landscapes and the ways forestry can affect the quality of scenery.

The project is being sponsored by the B.C. Forest Service. We will use the information to manage forests for greater public acceptance. Through our landscape management program, we can influence where logging occurs, the size and shape of timber cuts, the techniques used in logging specific areas, and the methods used for public participation in forestry decisions.

You can assist us by filling out a photo-questionnaire. We do not need to know your name but we do ask for some factual information so we can compare responses from different groups of people. Please add any comments or suggestions you may have which relate to the questions asked.

Thank you very much for your participation. We appreciate your time and help.

Sincerely,

Pieter J. Bekker
Landscape Forester
Nelson Forest Region

PJB:cc

Attachment

:0141M

SECTION I: Photograph Preferences

The photographs on the panels show a variety of forest landscapes in and near the Kootenays. First look through them briefly to see the kinds of areas included in the survey. Then rate each photograph on this form according to how much you like what you see. Circle a higher number the more you like the scene.

If you would like to indicate the primary reason(s) for your response, we would appreciate the additional information. Write comments in the margins or on the back of this page with the photograph number.

1 = do not like it at all
2 = like it a little
3 = like it somewhat
4 = like it quite a bit
5 = like it very much

COMMENTS

1. 1 2 3 4 5

3. 1 2 3 4 5

5. 1 2 3 4 5

COMMENTS

2. 1 2 3 4 5

4. 1 2 3 4 5

6. 1 2 3 4 5

PANEL A

7. 1 2 3 4 5

9. 1 2 3 4 5

11. 1 2 3 4 5

8. 1 2 3 4 5

10. 1 2 3 4 5

12. 1 2 3 4 5

PANEL B

13. 1 2 3 4 5

15. 1 2 3 4 5

17. 1 2 3 4 5

14. 1 2 3 4 5

16. 1 2 3 4 5

18. 1 2 3 4 5

PANEL C

1 = do not like it at all
2 = like it a little
3 = like it somewhat
4 = like it quite a bit
5 = like it very much

COMMENTS

COMMENTS

19. 1 2 3 4 5 20. 1 2 3 4 5

21. 1 2 3 4 5 22. 1 2 3 4 5

23. 1 2 3 4 5 24. 1 2 3 4 5

PANEL D

25. 1 2 3 4 5 26. 1 2 3 4 5

27. 1 2 3 4 5 28. 1 2 3 4 5

29. 1 2 3 4 5 30. 1 2 3 4 5

PANEL E

31. 1 2 3 4 5 32. 1 2 3 4 5

33. 1 2 3 4 5 34. 1 2 3 4 5

35. 1 2 3 4 5 36. 1 2 3 4 5

PANEL F

SECTION II: Forest Management Attitudes

A. The statements below describe different perspectives on the way logging impacts scenery. Please indicate the statement that is closest to the way you feel about logging in the Kootenay region.
(Circle the number next to the answer you choose.)

1. I have not noticed any logging.
2. The logging I have seen fits within the landscape well.
3. Some of the logging causes ugly scars and in other areas I see that it is hardly noticeable.
4. I have noticed some ugly scars but they don't bother me because I kow the areas will regenerate and I like the employment and/or economic aspects of logging here.
5. The logging in the region detracts from my enjoyment of the scenery.
6. Comments _____

_____

B. Clearcutting timber means that when an area is being logged, every tree over three metres in height within the area must be cut. Which of the following statements comes closest to describing your attitude towards clearcutting?

1. Clearcutting is an eyesore and should not be allowed.
2. Clearcutting should only be allowed where few people will ever see it.
3. Clearcutting can open up views and is acceptable especially if cuts are designed so that their size and shape fits in with the forms of the landscape in the area.
4. Clearcutting should be allowed anywhere in any form as long as adequate replanting occurs so cuts will regenerate and become green again quickly.
5. Clearcutting is the most economical way to log and there should be no restrictions placed upon it.
6. I am unfamiliar with clearcutting and do not have an opinion on it at this time.
7. Comments _____

_____

C. The B.C. Forest Service manages 95% of the land area of British Columbia. Please indicate how important you think each of the following considerations should be in forest management. Circle one number to the left of each item.

1 = not at all important
2 = slightly important
3 = somewhat important
4 = quite important
5 = very important

1	2	3	4	5	quality of the scenery (visually)	_____
1	2	3	4	5	economics of timber harvesting	_____
1	2	3	4	5	roadside or near-road recreation	_____
1	2	3	4	5	wilderness recreation	_____
1	2	3	4	5	environmental quality (e.g, soils, water, widlife)	_____

Which three of the above items are most important to you? Please write "1", "2", or "3" in the space to the right of those items in order of their importance.

D. Economic values of timber harvesting should have priority over scenic values:

1. in all cases
2. in some cases
3. never
4. don't know
5. Comments _____

E. Have you ever head about a public involvement program sponsored by the B.C. Forest Service?

1. yes, more than once
2. yes, once
3. no

F. Are you aware of the visual landscape management activities carried out by the B.C. Forest Service?

1. yes, very aware
2. slightly aware
3. no, not aware at all

G. Have you ever participated in a public involvement program sponsored by the B.C. Forest Service?

1. yes, more than once
2. yes, once
3. no

H. Would you be willing to attend workshops or open house sessions to provide public input to the B.C. Forest Service on visual landscape management?

1. yes
2. no
3. don't know or it depends

If you are interested, these sessions are advertised when they occur in the local press and on local radio stations.

SECTION III: Background Information

(Circle the number next to the answer you choose.)

A. Where is your principal residence:

1. in or near the Kootenays
2. elsewhere in B.C. or Alberta
3. elsewhere in Canada
4. in the U.S. within a five-hour drive of the Kootenays
5. elsewhere in the U.S. or the world

B. Why are you here now?

1. year-round resident - If so, how many years have you lived here? ___
2. seasonal resident
3. business
4. travel and/or recreation
5. other _____

C. What is your age?

1. less than 20
2. 20-29
3. 30-39
4. 40-49
5. 50-59
6. 60-69
7. 70 or over

D. What sex are you?

1. male
2. female

E. What is your occupation?

_____

F. What is the total income of your household?

1. less than $20,000
2. $20,000 to 39,999
3. $40,000 to 59,999
4. $60,000 to 79,999
5. $80,000 or over

G. How much formal education do you have? Please circle the highest level completed.

Public School						High School							Years of Post-Secondary							
1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	5	7	8+

Would you like to make any comments?

_____

_____

_____

Thank you very much for your participation in this project.